WHAT IS CLAIMED IS:

1. A linear actuator comprising:

a first yoke part;

a second yoke part opposing the first yoke part from a direction perpendicular to the axial direction thereof;

an intermediate yoke part forming a first gap and a second gap, which provides a distance from the second yoke part side in the axial direction, passes both sides, and provides a distance relative to the first yoke part;

a coil disposed within a space delineated by the intermediate yoke part and the second yoke part, which forms a magnetic field between the first yoke part and the intermediate yoke part, the orientation of which is opposite between the first gap and the second gap, and which alternates the orientation of the magnetic field;

a magnet disposed at one axial-direction end relative to the coil, which generates a fixed magnetic field in the first gap and the second gap, directed either from the intermediate yoke part toward the first yoke part or from the first yoke part toward the intermediate yoke part; and

an armature provided with a magnetic body, disposed so as to be movable in the axial direction in the first gap and the second gap.

2. A linear actuator comprising:

a first yoke part;

a second yoke part opposing the first yoke part from a direction perpendicular to the axial direction thereof;

an intermediate yoke part forming a first gap and a second gap, which provides a distance from the second yoke

part side in the axial direction, passes both sides, and provides a distance relative to the first yoke part;

a coil disposed within a space delineated by the intermediate yoke part and the second yoke part, which forms a magnetic field between the first yoke part and the intermediate yoke part, the orientation of which is opposite between the first gap and the second gap, and which alternates the orientation of the magnetic field;

a magnet disposed at one axial-direction end relative to the coil, which generates a fixed magnetic field in the first gap and the second gap, directed either from the intermediate yoke part toward the first yoke part or from the first yoke part toward the intermediate yoke part; and

an armature provided with a magnetic body, disposed so as to be movable in the axial direction in the first gap and the second gap,

wherein the first yoke part, the first gap, the second gap, the intermediate yoke part, and the second yoke part are disposed in this sequence from the inside outward, and are configured so as to have a circular or substantially polygonal shape when viewed from an axial direction.

3. A linear actuator according to claim 2, further comprising a bridging yoke part on a side of the coil at which the magnet is disposed, the bridging yoke part being adjacent to one yoke part of the first yoke part and the second yoke part and being distanced from the other yoke part of the first yoke part and the second yoke part, wherein the magnet is disposed between the bridging yoke part and the other yoke part, with different magnetic poles facing the bridging yoke

part and second yoke part.

4. A linear actuator according to claim 3, further comprising a non-magnetic body interposed between the bridging yoke part and magnet and the intermediate yoke part.

5. A linear actuator according to claim 2, further comprising a bridging yoke part on a side of the coil at which the magnet is disposed, the bridging yoke part being adjacent to the first yoke part and being distanced from the second yoke part, wherein the magnet is disposed between the bridging yoke part and the intermediate yoke part with different magnetic poles facing the bridging yoke part and the intermediate yoke part.

6. A linear actuator according to claim 3, wherein the bridging yoke part is formed as one either with the first yoke part, with respect to which it is adjacent, or with the second yoke part.

7. A linear actuator according to claim 4, wherein the bridging yoke part is formed as one either with the first yoke part, with respect to which it is adjacent, or with the second yoke part.

8. A linear actuator according to claim 5, wherein the bridging yoke part is formed as one either with the first yoke part, with respect to which it is adjacent, or with the second yoke part.

9. A linear actuator according to claim 2, wherein the second yoke part is formed as one with the intermediate yoke part.

10. A linear actuator according to claim 3, wherein the second yoke part is formed as one with the intermediate yoke

part.

11. A linear actuator according to claim 4, wherein the second yoke part is formed as one with the intermediate yoke part.

12. A linear actuator according to claim 5, wherein the second yoke part is formed as one with the intermediate yoke part.

13. A linear actuator according to claim 6, wherein the second yoke part is formed as one with the intermediate yoke part.

14. A linear actuator according to claim 7, wherein the second yoke part is formed as one with the intermediate yoke part.

15. A linear actuator according to claim 8, wherein the second yoke part is formed as one with the intermediate yoke part.

16. A pump apparatus using a linear actuator according to claim 1.

17. A pump apparatus using a linear actuator according to claim 2.

18. A pump apparatus using a linear actuator according to claim 3.

19. A compressor apparatus using a linear actuator according to claim 1.

20. A compressor apparatus using a linear actuator according to claim 2.

21. A compressor apparatus using a linear actuator according to claim 3.

22. A linear actuator, comprising:

a first yoke means;

a second yoke means opposing the first yoke means from a direction perpendicular to the axial direction thereof;

an intermediate yoke means forming a first gap and a second gap, which provides a distance from the second yoke means side in the axial direction, passes both sides, and provides a distance relative to the first yoke means;

coil means for generating a magnetic field, disposed within a space delineated by the intermediate yoke means and the second yoke means, which forms a magnetic field between the first yoke means and the intermediate yoke means, the orientation of which is opposite between the first gap and the second gap, and which alternates the orientation of the magnetic field;

a magnet means for generating a magnetic field, disposed at one axial-direction end relative to the coil means, which generates a fixed magnetic field in the first gap and the second gap, directed either from the intermediate yoke means toward the first yoke means or from the first yoke means toward the intermediate yoke means; and

an armature means provided with a magnetic body means, disposed so as to be movable in the axial direction in the first gap and the second gap.

23. A linear actuator, comprising:

a first yoke means;

a second yoke means opposing the first yoke means from a direction perpendicular to the axial direction thereof;

an intermediate yoke means forming a first gap and a second gap, which provides a distance from the second yoke

means side in the axial direction, passes both sides, and provides a distance relative to the first yoke means;

coil means for generating a magnetic field, disposed within a space delineated by the intermediate yoke means and the second yoke means, which forms a magnetic field between the first yoke means and the intermediate yoke means, the orientation of which is opposite between the first gap and the second gap, and which alternates the orientation of the magnetic field;

a magnet means for generating a magnetic field, disposed at one axial-direction end relative to the coil means, which generates a fixed magnetic field in the first gap and the second gap, directed either from the intermediate yoke means toward the first yoke means or from the first yoke means toward the intermediate yoke means; and

an armature means provided with a magnetic body means, disposed so as to be movable in the axial direction in the first gap and the second gap,

wherein the first yoke means, the first gap, the second gap, the intermediate yoke means, and the second yoke means are disposed in this sequence from the inside outward, and are configured so as to have a circular or substantially polygonal shape when viewed from an axial direction.